Section 11 ■ CONTENTS

TABLES

Section 11
DRINKING WATER SUPPLIES

This section describes the present drinking water systems in the basin, discusses present and future problems, and presents estimated future water requirements.

11.1 INTRODUCTION

In the Utah portion of the Bear River Basin, an estimated 51,170 acre-feet of water was provided for residential and commercial use in 1990. The corresponding future requirement is estimated to reach 65,560 acre-feet/year by the year 2010.

As used in this report, "drinking water" is defined as approximately synonymous with residential and commercial use, which means water that is used (or is available for use) as a culinary supply inside homes. It is supplied through a pipeline distribution system, and the quality is typically the highest available in the locality, because of treatment or because of pure natural sources. Most water systems are owned and operated by a municipality, but in a few cases the owner/operator is a private company, or is a state or federal agency. Regulatory categories of systems are defined in Section 11.2.

In addition to drinking water, the systems provide water for many inside and outside uses. Some examples are residential lawn and garden watering, car washing, swimming pools, public parks and streets, fire protection, commercial enterprises, and schools. Some industrial uses are supplied from municipal water systems in the basin, as noted in Tables 11-8 through 11-10. However, in this section, industrial water use has been purposely subtracted. Industrial water is discussed separately in Section 18.


Residential Water - Div. of Water Resources

The quality of present supplies is reasonably good, consisting almost entirely of groundwater. Approximately 88 percent of the basin's Utah residents are served by water systems that are approved by the state of Utah. Nine systems, however, are not fully approved and need to be upgraded. Other problems include (1) several communities needing new

supplies immediately but without a good available local source, (2) many communities with a need to expand and upgrade their systems, and (3) a need for all systems to meet the new and stringent standards imposed by the Safe Drinking Water Act.

11.2 SETTING

In Box Elder, Cache, Rich, and Summit counties, 128 drinking water systems have been identified. They are classified as follows and listed in Table 11-1.

-52 systems serve at least 15 residences that are occupied year-round. These are referred to as "Public, Community" Systems.

-42 systems serve at least 25 non-resident individuals for 60 days or more per year. These are referred to as "Public, Non-community" systems. Examples of this type include campgrounds, restaurants, and commercial establishments.

-34 systems do not meet the above two criteria. They are classified as "Non-public" systems, not legally subject to regulation under the provisions of federal and state Safe Drinking Water regulations.

The state agency responsible for regulating and monitoring "public" drinking water systems is the Division of Drinking Water. By action of the 1991 Utah Legislature, effective July 1, 1991, the Department of Environmental Quality was created, and the Bureau of Drinking Water/Sanitation was elevated to the Division of Drinking Water.

TABLE 11-1
DRINKING WATER SYSTEMS, BEAR RIVER BASIN (1990)

Size and Category	Box Elder	Cache	Rich	Summit	Total
Public, Community Systems					
More than 3,000 people	2	5	0	0	7
800 - 3,0000	7	7	0	0	14
25 - 800 people	15	11	5	0	31
Total	24	23	5	0	52
Public, Non-Community Systems					
State parks and campgrounds	2	10	2	8	22
Other systems	2	10	7	1	20
Total	4	20	9	9	42
Non-Public Systems					
State parks and campgrounds	2	9	0	0	11
Other systems	10	8	5	0	23
Total	12	17	5	0	34
Total	40	60	19	9	128

Source: Data from Utah Division of Drinking Water

11.2.1 Present Water Use

At 421 gallons per day, per capita use in the Bear River Basin is high, compared to the state average of 284. The per capita use is probably high because of lawn and garden watering, farm and dairy use, stock watering, and other non-culinary uses supplied from community water systems. Although several of the largest water systems exceed the state average, per capita use in 21 of the 52 water systems is less than the state average.

The 1990 level of residential and commercial water use is listed by county in Table 11-2. Definitions of these and other water uses are presented in Section 5.

11.2.2 Water Treatment and State Approval

The 52 public community water systems are served by about 110 springs and 70 wells. One community (North Logan) can be served in part by a surface source. Current treatment methods used on the above sources vary, as follows:

Springs with chlorination	**71**
Springs without chlorination or other treatment	**39**
TOTAL	**110**
Wells with chlorination	**31**
Wells without chlorination or other treatment	**39**
TOTAL	**70**
Surface water with complete treatment	**1**

Official ratings of the 52 public community water systems by the Utah Department of Environmental Quality are summarized in Table 11-3.

TABLE 11-2
PRESENT LEVEL OF RESIDENTIAL AND COMMERCIAL WATER USE

County	Water Systems (number)	1990 Level of Use (AF/year)
Box Elder	40	15,900
Cache	60	31,930
Rich	19	3,340
Summit	9	Negligible[a]
TOTAL	128	51,170

[a]Only in campgrounds and parks. See Table 11-1

TABLE 11-3
RATINGS OF PUBLIC COMMUNITY WATER SYSTEMS[1]

Official Rating	Box Elder	Cache	Rich	Total
"Approved"	17	21	5	43
"Not Approved"	3			3
"Corrective Action Required"	4	2	0	6
Total	24	23	5	52

Note: Public non-community and non-public systems are not rated.

11.2.3 System Improvements

Occasional repair, replacement, enlargement, or upgrading of each system is necessary to maintain the level of service expected. The improvements cover a wide range of facilities, but they consist mainly of new wells, storage tanks, and pipelines. Some communities have sometimes paid for these improvements without outside help, but most have made use of public funding programs. Specific funding programs are identified in Tables 8-1 and 8-2. The programs most widely used currently for improvement of drinking water systems are listed below, along with the entity or agency controlling each fund.

Cities Water Loan Fund
Board of Water Resources

Permanent Community Impact Fund
Community Impact Fund Board

Block Grants Program
Community Development Block Grants Policy Board

Financial Assistance Program
Drinking Water Board

Rural Development Program
U.S. Farmers Home Administration

As an indication of the approximate magnitude of improvements made through these programs, Tables 11-4, 11-5, and 11-6 have been prepared. They show that at least $30 million has been spent in 41 separate communities for this purpose since 1970. This figure is on the low side because it does not include projects that were self-funded by individual cities and towns. For example, Logan's self-funded improvements since 1970 have cost about $5 million, many times the amount shown for Logan in Table 11-5. The three tables show the total cost of projects for each community from the five funding programs referred to above, including the portion cost-shared by the community. It should be noted that these are heavy financial burdens for some of the smaller communities listed in the tables. Only about 14.4 percent of the total, or $4.4 million, consisted of grants. About $18.9 million of the total was for projects funded partially or entirely by the Board of Water Resources and the Drinking Water Board. Distribution of the total by counties was approximately as follows:

Box Elder	**32.2 %**
Cache	**58.4 %**
Rich	**9.4 %**
TOTAL	**100.0 %**

TABLE 11-4
PUBLIC WATER SYSTEM IMPROVEMENTS IN BOX ELDER COUNTY, 1970-91*

System	Cumulative Cost
Bear River City (Acme)	$ 273,000
Bothwell	79,000
Brigham City	1,179,000
Corinne	655,000
Deweyville	226,000
Elwood	320,000
Garland	1,186,000
Honeyville	595,000
Mantua	86,000
Perry	443,000
Plymouth	865,000
Portage	487,000
S. Willard	251,000
Thatcher/Penrose	870,000
Tremonton	1,525,000
W. Corinne	316,000
Willard	460,000
Total Costs	$9,816,000

*In addition to this table, improvements are planned for the Mantua and West Corinne water systems.

Data for the three tables came from files of the Utah divisions of Water Resources, Drinking Water, Community Development, and the U.S. Farmers Home Administration. Some minor double-counting probably appears in the figures, because two or more funding programs have been involved in about half of the projects. But, to the extent possible, reductions have been made in such cases, and any double-counting that remains is very small.

11.3 PROBLEMS AND NEEDS

This sub-section identifies needs which are immediate and long-term. A review of the current sources and storage capacities of the 52 public community water systems identified the following immediate needs.

1. Nine systems are currently deficient in storage and need enlargement.

2. Ten systems are currently deficient in source capacity and need to be increased.

3. Nine systems are not approved by the Utah Division of Drinking Water.

Specific locations of these needs are identified in Tables 11-8 through 11-13, which are described later.

11.3.1 Future Growth

In the next five years, the population of the study area is expected to grow by 5.7 percent (6,150 people). This is equivalent to about

TABLE 11-5
PUBLIC WATER SYSTEM IMPROVEMENTS IN CACHE COUNTY, 1970-91[a]

System	Cumulative Cost
Amalga	$260,000
Clarkston	820,000
Cornish	66,000
Cove Area (High Creek)	82,000
Hyde Park	975,000
Hyrum	4,166,000
Lewiston	1,166,000
Logan	88,000
Mendon	660,000
Millville	140,000
Newton	167,000
Nibley	901,000
N. Logan	2,375,000
Paradise	786,000
Providence	930,000
Richmond	354,000
Smithfield	2,190,000
Spring Creek Water Co.	60,000
Wellsville	1,630,000
Total Cost	$17,816,000

[a]In addition to this table, improvements are planned for the N. Logan, Riverside, and Cornish water systems. The Benson Water Improvement District is developing an entirely new water system.

TABLE 11-6
PUBLIC WATER SYSTEM IMPROVEMENTS IN RICH COUNTY, 1970-91[a]

System	Cumulative Cost
Garden City	$1,638,000
Laketown	76,000
Meadowville Spec. Service Dist.	50,000
Randolph	826,000
Woodruff	270,000
Total Cost	$2,860,000

[a]In addition to this table, further improvement of the Laketown system is being planned.

2,000 residences. The additional water demand of these 2,000 residences would be about 2,200 gallons per minute (peak day demand) and 2,900 acre-feet per year (average yearly demand).

Between 1990 and 2010, the basin's population is expected to increase by 30 percent (32,407 people). This represents approximately 10,000 residences. At present per capita use rates, the increased water requirement for this many new residents would be 14,400 acre-feet. The various means of meeting these needs (including conservation) are discussed in Section 11.4. Conservation is discussed in Section 17. Corresponding requirements for other future target dates are shown by counties in Table 11-7.

11.3.2 Current Deficiences

For individual communities, Tables 11-8 through 11-10 show estimated future water requirements compared with reliable water system capacities. The estimates of system capacity reflect the relationship between maximum annual delivery capacity of a system and the portion that is usable within the community's annual demand pattern. Although each system must be capable of meeting the maximum monthly and daily demands in the warmest part of summer, delivery at this rate during the remainder of the year would greatly exceed the demand. The annual usable portion of capacity, which falls within the yearly demand pattern, varies in accordance with how much lawn and garden use is included. The

TABLE 11-7
FUTURE WATER REQUIREMENTS FOR RESIDENTIAL AND COMMERCIAL USE

Item	Year	Box Elder	Cache	Rich	Total
Population[a]	1990	36,485	70,183	1,725	108,393
	2000	40,500	77,900	2,300	120,700
	2010	46,300	91,900	2,600	140,800
	2025	55,100	114,900	3,200	173,200
		Withdrawals/Diversions (AF/year)			
Water Use[b]	1990	15,900	31,930	3,340	51,170
	2000	17,660	35,330	3,560	56,550
	2010	20,180	41,610	3,770	65,560
	2025	24,020	51,990	4,320	80,330
1990 Per Capita Use					
	AF/Yr.	.436	.455	.516	.472
	Gal/Day	389	406	461	421

(Conversion: 1.0 AF/Yr = 892.7 Gal/Day)

[a]From Utah Office of Planning and Budget (Reference No. 2).
[b]Calculated from the population projections above and 1990 per capita use rates.

TABLE 11-8
RESIDENTIAL AND COMMERCIAL GROUNDWATER REQUIREMENTS/SUPPLY FOR BOX ELDER COUNTY

Public Community Water System	Population Served 1990	2000	2010	2025	1990 Per Capita Use (AF/Yr.)	Water Requirements (Acre-feet/year) 1990	2000	2010	2025	1991 Reliable System Supply Capacity
Brigham City	15,644	16,658	18,645	22,280	.605	9474	10,090	11,290	13,490	10,032
Tremonton	4,264	4,904	5,702	6,761	.350	1492[e]	1,720	2,000	2,370	1,584
Garland	1,637	1,835	2,104	2,498	.367	601	674	772	917	810
Willard	1,298	1,419	1,607	1,913	.350	454	496	562	669	964
Perry	1,211	1,346	1,537	1,826	.209	253[f]	281	321	381	784
Honeyville	1,112	1,326	1,573	1,866	.401	446	532	631	748	1,127
W. Corinne Water Co.*	1,100	1,720	1,970	2,340	.198	218	242	277	329	218*
Riverside/N. Garland	1,000	1,110	1,270	1,510	.171	171	190	217	258	198
Thatcher/Penrose Co.	812	900	1,030	1,230	.214	174	190	220	260	576
Ukon Water Co.[a]	800	760	870	1,030	.114	91	101	115	137	131
Acme Water Co.[b]	750	812	948	1,124	.251	188	204	238	282	212
Mantua	665	777	911	1,080	.280	186	217	255	302	333
Corinne*	639	714	818	971	.117	75	140	160	200	75*
Elwood	575	711	863	1,028	.191	110	140	160	197	292
Bothwell Water Co.*	400	300	340	410	.232	93	100	120	140	93*
Deweyville	318	351	399	475	.318	101	111	127	151	128
Plymouth	267	296	337	401	.393	105	116	133	158	390
South Willard	225	250	290	340	.267	60	70	80	90	198
Portage	218	251	292	346	.280	61	70	82	97	335
Evans Water Co.	150	170	190	230	.436	65	74	83	100	65+
3 Trailer Courts[c]	260	260	260	260	.436	113	113	113	113	113+
Cedar Ridge Subd.[d]	50	60	65	80	.436	22	26	28	35	22+
Subtotal	33,395	36,703	41,760	49,692	.436	14,553	15,897	17,984	21,424	18,680
Other Water Systems	3,090	3,797	4,540	5,408	.436	1,347	1,763	2,196	2,596	1,350
County Total	36,485	40,500	46,300	55,100	.436	15,900	17,660	20,180	24,020	20,030

[a]E. Garland/Fielding
[b]Bear River City
[c]Willard/ S. Willard
[d]Tremonton
[e]In addition to this figure, Tremonton also provides 92 acre-feet of industrial water.
[f]In addition to this figure, Perry also provides 26 acre-feet of industrial water.
[g]Does not include 400 acre-feet of surface water.
+Reliable system supply capacity estimated to be equal to or greater than 1990 water requirements.
*Available data indicates present use is approximately equal to system capacity.

TABLE 11-9
RESIDENTIAL AND COMMERCIAL GROUNDWATER REQUIREMENTS/SUPPLY FOR CACHE COUNTY

Public Community Water System	Population Served 1990	2000	2010	2025	1990 Per Capita Use (AF/Yr.)	Water Requirements Acre-feet/year 1990	2000	2010	2025	1991 Reliable System Supply Capacity
Logan	32,726	34,895	40,229	50,315	.465	15,245[a]	16,230	18,700	23,400	19,948
Smithfield*	5,566	6,147	7,207	8,976	.482	2,681	2,960	3,470	4,330	2,681*
Hyrum	4,829	5,640	6,809	8,470	.628	3,034[b]	3,540	4,280	5,320	4,542
North Logan	3,768	4,690	5,880	7,374	.206	777[c]	970	1,210	1,520	1,545[i]
Providence	3,344	3,908	4,719	5,870	.431	1,440	1,680	2,030	2,530	2,211
Wellsville	2,206	2,465	2,907	3,617	.618	1,363[d]	1,520	1,800	2,230	1,936
Hyde Park	2,190	2,564	3,099	3,855	.328	718	840	1,020	1,260	761
Richmond	1,955	2,259	2,711	3,372	.571	1,117	1,290	1,550	1,930	2,299
Lewiston	1,532	1,567	1,776	2,238	.446	684	700	790	1,000	1,449
River Heights	1,274	1,312	1,491	1,876	.378	482	500	560	710	1,508
Millville	1,202	1,513	1,909	2,400	.160	192	240	310	380	251
Nibley	1,167	1,618	2,184	2,850	.509	594[e]	820	1,120	1,450	1,012
Mendon*	684	805	976	1,215	.630	431	510	610	760	431*
Newton	659	707	818	1,022	.361	238	255	300	370	378
Clarkston	645	696	806	1,007	.260	168	180	210	260	705
Paradise	561	594	683	855	.130	73	80	90	110	88
Trenton	464	471	532	672	.343	159	160	180	230	230
Amalga*	366	411	485	604	.792	290[f]	330	380	470	557*
Cornish	205	208	235	296	.210	43[g]	44	49	62	97
Riverside Water Co.	88	98	115	140	.182	16	18	21	25	274
S.Cove Water Co.	63	70	82	100	.429	27	30	35	43	165
Goaslind Spg. Water Co.*	50	55	65	80	1.300	65	72	84	100	65*
High C. Water Co.*	35	39	46	60	.371	13	14	17	22	13*
Subtotal	65,615	72,732	85,764	107,264	.455	29,850	32,983	38,816	48,512	43,145
Other Water Systems	4,568[h]	5,168	6,136	7,636	.455	2,080	2,347	2,794	3,478	2080
County Total	70,183	77,900	91,900	114,900	.455	31,930	35,330	41,610	51,990	45,225

a) In addition, Logan provides 272 acre-feet for industrial use.
b) In addition, Hyrum provides 1,128 acre-feet for industrial use.
c) In addition, N. Logan provides 65 acre-feet for industrial use.
d) In addition, Wellsville provides 92 acre-feet for industrial use.
e) In addition, Nibley provides 2 acre-feet for industrial use.
f) In addition, Amalga provides 267 acre-feet for industrial use.
Total 1,869 acre-feet for industrial use.
g) In addition, Cornish provides 43 acre-feet for industrial use.
h) Included in this total are about 411 residents who will be served by a new water system under development by the Benson Water Improvement District. May be in operation in 1992.
i) Does not include 500 acre-feet of surface water.
*) Present data indicates that present use (including industrial) is approximately equal to system capacity.

TABLE 11-10
RESIDENTIAL AND COMMERCIAL GROUNDWATER REQUIREMENTS/SUPPLY IN RICH COUNTY

Public Community Water Systems	Population Served				1990 Per Capita Use (AF/Yr.)	Water Requirements (Acre-feet/year)				1991 Reliable System Supply Capacity
	1990	2000	2010	2025		1990	2000	2010	2025	
Garden City Residents	193	237	268	330						
Estimated visitors[a]	2537	2540	2600	2800						
Subtotal	2730	2777	2868	3130	.926	2529	2570	2650	2900	2689
Randolph	488	718	812	999	.197	96	141	160	197	345
Laketown[b]	261	305	345	425	.291	76	89	100	124	157
Woodruff	135	228	258	317	.311	42	71	80	99	188
Mtn. Meadow Park	59	60	60	60	.407	24	24	24	24	24
Subtotal	943	1,311	1,475	1,801	.252	238	325	364	444	714
Community System Subtotal	3,673	4,088	4,459	4,931		2,767	2,895	3,014	3,344	3,403
Other Water Systems										
Residents	589	752	857	1,069						
Estimated visitors[c]	1,691	1,875	2,127	2,800						
Subtotal	2,280	2,627	2,984	3,869	.252	573	665	756	976	575
Rich County										
Residents[d]	1,725	2,300	2,600	3,200						
Estimated visitors	4,228	4,415	4,727	5,600						
Total	5,953	6,715	7,327	8,800	.561	3,340	3,560	3,770	4,320	3,978

[a]This system serves a wide area extending from the state line to (and including) Sweetwater Park. This area is impacted by numerous non-resident visitors in the summer. The equivalent year-round population represented by the large annual temporary influx is estimated to be 2537. 6/

[b]Approximately 20 acre-feet of industrial use (meat-packing operation) is provided by this water system.

[c]Other Bear Lake area visitors are served by "non-community" systems. Included in this category are Rendezvous Beach State Park, South Bear Lake Water Users Co-op, other summer homes and cabins along the south and east lake shores, Bridgerland Village, and several Forest Service campgrounds. These water systems are estimated to serve 40% of the Rich County visitors at present, and 50% by the year 2025.

[d]The 1990 census data gives county and community populations. Projected populations for each were estimated by the Utah Office of Planning and Budget.

pattern for inside use only is more nearly uniform throughout the year. Considerable outside use requires proportionately more water in the summer and, therefore, a greater system capacity. These tables indicate that 10 systems are presently at the limit of their capacity: Tremonton, West Corinne, Corinne, Bothwell, Smithfield, Mendon, Amalga, Goaslind, High Creek, and Mountain Meadow Park. Some of these are in the process of developing new facilities.

Tables 11-11 through 11-13 show the existing storage capacity for each community water system, compared with future storage capacity needed as the community grows. Typically, the storage consists of one or more tanks of steel or reinforced concrete, and the tanks feed directly into the community's distribution lines. Tank sizes vary from less than 20,000 gallons to more than a million gallons each. Additional tanks are added as the system grows.

The volume of storage needed consists of a quantity for emergency fire-fighting operations, plus an ordinary reserve for residential use. The fire flow requirement is normally considered to be 750 gallons per minute for two hours, which is equal to 90,000 gallons. However, for larger communities the requirement is greater. For very small communities, the requirement is less. In Tables 11-11 through 11-13, fire-flow needs are as follows: For Logan and Brigham City; 2,500 gallons per minute (gpm) for four hours (or 600,000 gallons); for Smithfield, Hyrum, and Tremonton, 1,500 gpm for two hours (180,000 gallons); for all other communities except the smallest, 750 gpm for two hours (90,000 gallons); and for communities with less than 100 connections, 500 gpm for two hours (or 60,000 gallons).

The ordinary reserve for residential use is considered by the Utah Division of Drinking Water to be 400 gallons per connection for inside use only, and 800 gallons per connection when used outside for lawn and garden watering, as is common in these three counties. The "outside use factor" in the tables reflects these differences. A few communities, such as Paradise in Cache County, have a dual water system for outside use, so the community drinking water supply is used only inside. Other communities have a partial outdoor system for lawn and garden watering, which in some cases is just a local irrigation supply.

Thus, the 1990 computed storage requirement for Honeyville, for example, is 800 gallons per connection times 350 connections (equal to 280,000 gallons of ordinary reserve) plus 90,000 gallons for fire flow, or a total of 370,000 gallons. Honeyville's existing storage capacity is 435,000 gallons, so there is a reserve which will last until sometime after the year 2000. In computing future storage requirements, it is assumed that the number of connections will increase at the same rate as the population.

These computations indicate that nine community systems are in need of more storage now: Acme, Cornish, North Logan, Laketown, Mountain Meadow Park, Mantua, Portage, South Cove, and Goaslind Spring Water Company (Cove Area). However, none of these deficits is large, and plans are underway to correct most of the deficits.

Regulatory approval of a public community drinking water system is given when the system is officially recognized as meeting certain minimum public health standards. The Utah Department of Environmental Quality has approved all but nine of the 52 public community systems in the basin. As shown previously in Table 11-3, six are in a category called, "corrective action required," and three others are "not approved." Both of these categories are considered to be transitional rather than permanent. Full approval of the nine systems not presently approved is

TABLE 11-11
STORAGE CAPACITY NEEDED
FOR COMMUNITY WATER SYSTEMS IN BOX ELDER COUNTY

Water System	No. of Connections (1990)	Outside Use Factor (gal.)	Computed Storage Requirement (gallons) 1990	2000	2010	2025	Existing Storage (1991)
Brigham City	4687	800	4.35mg.	4.59mg.	5.07mg.	5.94mg.	6.5mg.
Tremonton	1724	770	1.51mg.	1.70mg.	1.95mg.	2.78mg.	2.37mg.
Garland	600	800	570,000	626,000	706,000	822,000	1.35mg.
W. Corinne	230	620	233,000	248,000	270,000	307,000	325,000
Willard	442	800	444,000	474,000	530,000	610,000	670,000
Perry	376	800	391,000	426,000	474,000	546,000	650,000
Honeyville	350	800	370,000	426,000	490,000	562,000	435,000
Riverside/N. Garland	238	800	280,000	298,000	330,000	378,000	375,000
Thatcher-Penrose	238	800	280,000	298,000	330,000	378,000	700,000
Acme Water Co.	278	620	262,000	276,000	307,000	350,000	200,000
Ukon Water Co.	256	600	244,000	260,000	285,000	321,000	270,000
Mantua	222	800	268,000	298,000	334,000	378,000	244,000
Corinne	232	480	201,000	215,000	234,000	258,000	300,000
Elwood	158	800	216,000	246,000	282,000	314,000	400,000
Deweyville	95	800	136,000	144,000	156,000	172,000	310,000
Bothwell Water Co.	94	400	98,000	102,000	108,000	116,000	165,000
Plymouth	100	800	140,000	148,000	164,000	180,000	150,000
S. Willard	86	800	129,000	137,000	148,000	164,000	140,000
Portage	81	800	125,000	134,000	146,000	164,000	122,000
Evans Water Co.	77	800	122,000	130,000	138,000	154,000	325,000
Cedar Ridge Subdivision	(25)						
3 Trailer Courts	(80)						

TABLE 11-12
STORAGE CAPACITY NEEDED
FOR COMMUNITY WATER SYSTEMS IN CACHE COUNTY

Water System	No. of Connections (1990)	Outside Use Factor (gal.)	Computed Storage Requirement (gallons) 1990	2000	2010	2025	Existing Storage (1991)
Logan	7145	720	5.74mg.	6.08mg.	6.91mg.	8.50mg.	7.5mg.
Smithfield	1580	560	1.06mg.	1.15mg.	1.33mg.	1.61mg.	2.45mg.
Hyrum	1219	620	936,000	1.06mg.	1.25mg.	1.51mg.	3.265mg.
N. Logan	1013	690	789,000	959,000	1.18mg.	1.46mg.	725,000[a]
Providence	950	800	850,000	978,000	1.16mg.	1.43mg.	1.63mg.
Wellsville	580	800	554,000	610,000	698,000	850,000	940,000
Hyde Park	578	750	524,000	600,000	705,000	855,000	725,000
Richmond	529	560	386,000	432,000	499,000	600,000	750,000
Lewiston	550	800	530,000	538,000	602,000	730,000	830,000
River Heights	393	800	404,000	414,000	458,000	554,000	500,000
Millville	294	800	325,000	386,000	464,000	562,000	336,000
Nibley	317	800	344,000	442,000	562,000	706,000	1,300,000
Mendon	236	800	279,000	312,000	360,000	425,000	600,000
Newton	218	480	195,000	202,000	220,000	252,000	250,000
Clarkston	190	800	242,000	254,000	280,000	328,000	500,000
Paradise	183	400	163,000	168,000	179,000	202,000	300,000
Trenton	140	800	202,000	204,000	219,000	252,000	220,000
Benson (new system)	125	800	190,000	200,000	215,000	246,000	(0)[b]
Amalga	114	800	181,000	192,000	211,000	240,000	230,000
Cornish	70	800	116,000	117,000	124,000	141,000	100,000[c]
Riverside Water Co.	25	800	80,000	82,000	86,000	92,000	100,000
S. Cove Water Co.	20	800	76,000	78,000	80,000	86,000	20,000
Goaslind Spg. Water Co.	14	800	71,000	72,000	74,000	78,000	20,000
High C. Water Co.	16	480	68,000	69,000	70,000	73,000	160,000

[a]A new one-million-gallon tank will be built within the next five years.
[b]New system (to be completed in 1993) will include a 300,000-gallon tank.
[c]Community has asked for state assistance to upgrade its water system.

TABLE 11-13
STORAGE CAPACITY NEEDED
FOR COMMUNITY WATER SYSTEMS IN RICH COUNTY

Water System	No. of Connections (1990)	Outside Use Factor (gal.)	Computed Storage Requirement (gallons) 1990	2000	2010	2025	Existing Storage (1991)
Randolph	180	800	234,000	302,000	330,000	386,000	900,000
Laketown	104	800	173,000	188,000	200,000	235,000	92,000[a]
Garden City	430	800	434,000	514,000	570,000	597,000	600,000
Woodruff	67	800	144,000	180,000	192,000	243,000	600,000
Mtn. Meadow Park	22	800	78,000				60,000

[a]Completion of new 250,000-gallon tank expected in 1992.

anticipated when the required items of improvement are complete. In the meantime, the need for reaching full approval is urgent.

11.3.3 Training and Certification

Training and certification of system operators is a continuing need. Certification is important because it requires a minimal level of training which helps to safeguard public health. Most of the current need is among the smaller communities. Eight of the nine systems not fully approved by the Utah Division of Drinking Water serve communities with less than 800 people. Recent legislation requires that community systems of 800 or less must have a certified operator.

11.3.4 New Federal Requirements

Additionally, new federal requirements for water quality may impact some systems significantly. Congress' 1986 Amendments to the Federal Safe Drinking Water Act resulted in more stringent requirements for the quality, monitoring, and treatment of public drinking water. Among other things, the amendments required:

1. That EPA set maximum contaminant levels (MCLs) for 83 specific contaminants and for any other contaminant in drinking water that may have any adverse effect upon the health of persons.

2. That EPA also set MCLs for 25 additional contaminants every three years.

3. That criteria be established for determining which surface water systems must install filtration.

4. That a treatment technique regulation must be promulgated to require all public water systems to use disinfection.

The congressional mandates will require changes in Utah's drinking water rules. It is anticipated that by January 1993 the following rules may be adopted in the state:

Surface Water Treatment Rule - This rule decreases the allowable level of turbidity, changes disinfection requirements, and requires that groundwater sources be classified as groundwater or groundwater influenced by surface water.

Phase II Regulations - An additional 38 contaminants will be monitored.

Lead and Copper Rule - Provisions for the monitoring and treatment of lead and copper will be implemented.

If adopted, these regulations may impact public drinking water systems in the Bear River Basin. Monitoring costs will increase. Furthermore, since the region has a large number of culinary springs, and some of these springs may be surface-water influenced, construction of additional conventional,

complete treatment plants may be necessary.

The EPA estimates that increased monitoring because of Phase II regulations should be less than $10 per household per year. If a water treatment system is required to meet standards, costs could be considerably more. For example, if a granular activated carbon system is installed to remove synthetic organic contaminants (i.e. pesticides), treatment costs could be anywhere from $40 to $600 per household per year, depending on the size of the system. If a conventional, complete treatment plant is constructed to treat a spring contaminated with surface water, costs could be greater than $50 per household per year.

Since monitoring has not yet begun, it cannot be said with any certainty how many systems will have to install additional treatment facilities. It is unlikely that synthetic organic contaminants will be a problem. However, some culinary springs in the Bear River Basin are suspected to be "surface water influenced" and additional treatment facilities may be required.

11.3.5 Deterioration of Facilities

In addition to new water supplies, most of the systems will need new distribution lines and other facilities to replace those that will be lost to normal deterioration. The total expense for new facilities and water system improvements (including deterioration) in the three counties during the next 25 years will be approximately $60 million. This cost is in addition to present expenditures for operation and maintenance.

Table 11-14 shows the number of leaks in recent years in systems for which a requested report was received in 1991. The significance of this information is the relationship between frequency of recurring leaks and general deterioration of a distribution system. Therefore, this data gives an indication of where heavy expenditures for replacement systems may be imminent. Also, there are doubtless many other communities with non-reported leakage problems in their distribution systems. The right-hand column in this table reduces the data to a comparative basis (leaks per 100 connections per year).

11.4 ALTERNATIVE SOLUTIONS OR ACTIONS

Problems and needs identified for consideration in Section 11.3 are (1) anticipated future growth of water requirements, (2) current deficiencies in system capacity, storage, and regulatory approval, (3) training and certification of system operators, (4) new federal requirements for water quality, and (5) replacement of aging facilities.

Actions to meet these needs, though difficult and expensive, are fairly obvious and straightforward for all but the first item. And actions by communities are already underway to solve present needs and deficiencies. Existing funding and technical assistance programs are available and being used to correct present deficiencies, train and certify operators, meet new federal requirements, and replace facilities. Since each community's circumstances are different, not all are being (or will be) met exactly the same; and every drinking water need must be resolved on a community basis.

Means for meeting future growth are more varied than the other four needs identified, and there are varying opinions on which would be best. Water conservation, further use of existing supplies, drilling of new wells, construction of new reservoirs, and inter-county transfers are all recommended. But none of these fit every community, and no community would employ all of them.

Most communities have a reserve capacity, some of which is necessary in meeting unusual demand periods, and some of which is presently a surplus. According to data in

TABLE 11-14
SUMMARY OF REPORTED LEAKS IN DISTRIBUTION SYSTEMS[a]

County	Supplier	No. of Connections	No. of Reported Leaks	Leaks/ 100 Conn./ Year
Box Elder	Acme	278	3	1.1
	Deweyville	95	1	1.0
	Elwood	158	4	2.5
	Mantua	222	2	0.9
	Perry	376	12	3.2
	Portage	81	1	1.2
	Riverside/N. Garland	238	2	0.8
	Thatcher/Penrose	238	5	2.1
	Willard	442	20	4.5
Cache	Amalga	114	6	5.3
	Hyde Park	578	6	1.0
	Millville	294	20	6.0
	N. Logan	1013	15	1.5
	Smithfield	1580	30	1.9
	Wellsville	580	25	4.3
Rich	(None reported)			

[a]No report from other communities.
Source: Utah Division of Drinking Water.

Table 11-8 through 11-10, of the 52 community water systems, 30 have enough current capacity to carry them beyond the year 2010 (at present per capita use rates); and 21 systems have enough to carry them beyond 2025. Lewiston, for example, would apparently still have a reserve capacity of 112 percent in 2025. The remainder, however, have little or no reserve capacity at the present time. As expected, systems without reserve capacity have the greatest need for new water supplies (or other solutions).

If new future water requirements are to be satisfied by conservation, which means that the present level of use would remain constant, the per capita use rate must drop drastically. For example, Table 11-7 shows a basin population of 140,800 in the year 2020. To maintain the 1990 water use at 51,170 acre-feet, an overall per capita use rate of 0.363 acre-feet/year would be necessary. This would be a drop of 33 percent. To maintain the present use rate to the year 2025 would require a drop of 37 percent. In communities with high use rates, these decreases are probably achievable, but in others the rate is already low. Twenty-one of the 52 community systems use less water per capita than the state average of 0.318 acre-feet/year. Ten communities are below 0.210. It would be difficult to reduce these much further. For the two largest cities, Logan and Brigham City, a present decrease to the state

average would be 32 and 47 percent, respectively. To maintain their present levels of use to the year 2010 would require a future decrease of 18 to 16 percent in each case. In summary, the communities needing water the most are the very ones least able to meet their needs by water conservation alone. And communities with a large surplus have little incentive to conserve. This further emphasizes the concept that each community must be considered separately. Another reality is that public opinion is the major factor in water conservation. Conservation is discussed more fully in Section 17.

In many areas of the basin, communities can, with the State Engineer's approval, drill a new well and obtain a new water supply of good quality. Current groundwater supplies are assumed adequate to provide culinary water for most of the 32,400 additional residents anticipated by the year 2010. Small amounts of surface water will supply the remainder. To utilize the additional groundwater or to develop surface supplies, new facilities for storage, treatment, and distribution will also be needed.

Good quality groundwater is not available everywhere, however. In Box Elder County, for example, where about seven communities are currently needing more water, this is true. The remaining supply is quite limited and quite localized. A small amount of good-quality groundwater can still be developed along the eastern edge of the county. A larger quantity could probably be developed and imported from Cache Valley. The Bear River Water Conservancy District is currently investigating the potential of developing wells in Cache Valley and hope to deliver up to 7,000 acre-feet of additional M & I groundwater to Box Elder County by the year 2000. This inter-county transfer would require the building of a new pipeline conveyance system.

The other alternative for Box Elder County is to develop a surface water supply. If surface water is used, extensive water treatment will be necessary. The associated costs are high. Box Elder County could elect to develop a surface water supply unilaterally, or could to do so in cooperation with the state, or with other entities.

New reservoir construction for drinking water supplies will probably not be necessary in the immediate future, unless the State Engineer eventually requires the replacement of new groundwater development in Cache Valley with new surface water supplies.

The most likely means that will be utilized in meeting future drinking water requirements is a combination of conservation and new groundwater development. But the combination will vary from one community to another because of differing circumstances. The selection will reflect the local public opinion, and will generally be the easiest and least expensive option.

11.5 RECOMMENDATIONS

These recommendations relate directly to the immediate and long-term needs identified in Section 11.3.

11.5.1 Providing for Future Growth

System owners should: (1) continue to maintain and upgrade existing systems, including protection of each water source, (2) enlarge existing systems and/or build new systems to accommodate future growth in the basin; (3) and initiate public education programs to promote water conservation in each community.

11.5.2 Systems Not Fully Approved

The Utah Department of Environmental Quality should provide assistance to upgrade the nine public community systems not fully approved to achieve an "approved" status.

11.5.3 Systems Currently Deficient in Storage and Source Capacity

The owners/operators of nine systems currently deficient in storage capacity and the 10 systems deficient in source capacity should begin efforts to design, finance, and build the needed improvements.

11.5.4 Public Water Systems Operator Certification

The Utah Division of Drinking Water should encourage and assist operators of all public water systems to be trained and certified, with specific attention given to those nine systems not fully approved.

11.5.5 Financial Assistance Programs

The costs will be enormous to install new facilities and improve existing facilities along with anticipated costs to meet new federal requirements. Limited federal financial assistance is expected. Although the primary responsibility for implementation and funding of drinking water system improvements rests with the owners of each system, the financial assistance programs of the Drinking Water Board and the Board of Water Resources should be continued in order to assist with improvements.

11.6 REFERENCES

In addition to the references listed below, attention is directed to Section 11 of the Utah State Water Plan, January 1990, where more detail is given concerning drinking water supplies, and two related issues are discussed.

1. "Public Water Supply Information System" (computer data printout sheets). Utah Division of Drinking Water.

2. "1987 Baseline Projection," April 1987, "Economic and Demographic Projections, 1988," April 1988, and "Economic and Demographic Projections, 1990," Dec. 1989. Utah Office of Planning and Budget.

3. "Water Use Data for Public Water Supplies", Utah Division of Water Rights, Water User Reports No. 1-6, 1979-85.

4. "Bear River Water Development Study", Hansen, Allen, and Luce, Inc., Consultants/Engineers, and Valley Engineering, Inc., Feb. 1989, and "Conceptual Level Engineering Plan," Dec. 1989.

5. 1984 Community Water System Capital Facilities Needs Survey - Summary Report, University of Utah Bureau of Economic and Business Research for Utah State Dept. of Health, February 1985.

6. "Present Water Supplies, Uses, and Rights - Bear River Development"; Hansen, Allen, and Luce, Inc., for Utah Division of Water Resources, June 1991.